

CLAIMS

What is claimed is:

1. A disposable air filter comprising;

a filter frame and a pleated air filter media, said pleated air filter media having generally rectangular interconnected panels collapsible so that adjacent panels are disposed in juxtaposed relation,

said filter frame being made from a generally planar blank that is pre-scored, slit and die-cut to define a rectangular filter frame having a central area enabling airflow therethrough and having laterally opposite longitudinal and transverse wall panels foldable to positions normal to said central area and defining a peripheral wall about said central area sized to receive and support the pleated filter media when in an expanded condition so that substantially all air passing into said central area passes through said filter media,

said filter frame blank being foldable to a substantially flat condition having a rectangular size generally equal to the rectangular size of the collapsed filter media panels so as to enable compact stacking with said collapsed filter media and insertion into a carton.

2. A disposable air filter as defined in claim 1 wherein said filter frame longitudinal and transverse wall panels have means on opposite ends thereof enabling said wall panels to be interconnected to form a rectangular air filter frame, said filter frame wall panels having planar panel portions and laterally opposite longitudinal marginal edge portions foldable to positions normal to said planar panel portions so as to define wall panels having channel-shaped transverse cross-sections to receive and retain said expanded pleated filter media.

3. A disposable air filter as defined in claim 2 wherein said filter frame blank further defines a plurality of separating fingers disposed in a row and adapted to be attached to said filter frame for insertion between adjacent pleats of said pleated filter media when in its expanded condition within said filter frame.

4. A disposable air filter as defined in claim 3 wherein said filter frame blank defines a plurality of rows of said separating fingers, each of said rows being adapted for attachment to said filter frame transverse to the pleats of the filter media when disposed in said filter frame.

5. A disposable air filter as defined in claim 2 wherein at least one of filter frame wall panels has a plurality of separating fingers formed thereon in a manner to enable insertion of said fingers between adjacent pleats of a pleated filter media when supported by said rectangular filter frame.

6. A disposable air filter as defined in claim 1 including a filter grill made from a blank that is pre-scored, slit and die-cut to define laterally opposite pairs of side and end panels formed integral with a generally open central area, said side and end panels being foldable to positions substantially normal to said central area and adapted to be received internally of free marginal edges of said filter frame with said central areas generally parallel, said filter grill and filter frame having mutually cooperable means for retaining them in assembled relation with an expanded pleated filter media disposed between said filter frame and filter grill.

7. A disposable air filter as defined in claim 6 wherein said filter grill includes at least one row of substantially equally spaced separating fingers adapted to be inserted between adjacent pleats in an expanded pleated filter media when disposed between said filter grill and filter frame.

8. A disposable air filter as defined in claim 6 wherein said filter frame and filter grill blanks are made from a lightweight corrugated cardboard.

9. A disposable air filter as defined in claim 2 wherein said means on the opposite ends of said wall panels enabling said panels to be interconnected to form a rectangular air filter frame include mutually cooperable slots and tabs.

10. A disposable air filter as defined in claim 1 including an end plate secured in juxtaposed relation to an outer exposed surface of each end panel of said filter media, said end plates being substantially equal in size to the exposed surface area of the corresponding filter media end panel.

11. A disposable air filter as defined in claim 1 wherein said filter frame central area has substantially greater air flow open area than a remaining non-open area of said central area.

12. A disposable air filter as defined in claim 10 wherein said rectangular filter media panels have greater longitudinal length than transverse width, said filter element pleats having greater longitudinal length than the distance between said filter frame wall panels adjacent the ends of said filter element pleats when disposed within said filter frame with the longitudinal lengths of said filter panels substantially normal to said adjacent filter frame wall panels so as to prevent air passage between the ends of said filter panels and said adjacent filter frame wall panels.

13. A disposable air filter as defined in claim 10 wherein said end plates are made from a rigid material.

14. A disposable air filter as defined in claim 13 wherein said rigid material comprises a rigid cardboard.

15. A disposable air filter assembly as defined in claim 1 wherein said pleated filter media has opposite side surfaces, and including a metallic mesh support grid adhesively secured to a selected one of said side surfaces of said pleated filter media.

16. A disposable air filter assembly as defined in claim 1 including means secured to a selected side surface of said pleated filter element for preventing collapse of said panels during passage of air through the filter assembly.

17. A disposable air filter assembly as defined in claim 7 wherein said separating fingers are sufficient in number so that a finger extends into each space defined between adjacent pleats of said pleated filter media when expanded.

18. A disposable air filter assembly as defined in claim 7 wherein said separating fingers are formed integral with said filter grill blank so as to define at least two transverse rows of said separating fingers.

19. A disposable air filter assembly as defined in claim 18 wherein said separating fingers in each of said transverse rows have free ends extending in a direction toward the free ends of the fingers in the other row of separating fingers.

20. A method of making a disposable air filter kit comprising the steps of:

providing an expandable pleated filter media having a plurality of generally equal size rectangular filter panels with end plates affixed to outer exposed surfaces of the opposite end panels;

providing a filter frame including a plurality of frame member panels adapted to be stacked in juxtaposed relation with said pleated filter media when in a collapsed condition, said frame member panels having means disposed on free ends thereof for enabling interconnection of said panels to create a rectangular filter frame sized to receive said pleated filter media into said filter frame when expanded so that opposite free end edges on said filter panels engage selected frame member panels to prevent air passage past the free ends of said filter panels; and

providing a plurality of separating fingers adapted to be compactly stacked with said frame members and collapsed pleated filter media into a kit and being cooperative with said frame member panels to enable insertion of said fingers into openings created between adjacent pleats in the expanded filter media to maintain the pleats in stable positions in the assembled air filter.

21. A disposable air filter assembly comprising, in combination,

an expandable pleated air filter element having a plurality of interconnected panels of generally equal longitudinal length and transverse width;

a filter frame made from a generally rectangular corrugated cardboard blank defining a generally planar rectangular central area enabling air passage therethrough, said blank defining laterally opposite longitudinal side panels and transverse end panels disposed coplanar with said central area and being foldable about respective substantially longitudinal and transverse fold lines to positions generally normal to said central panel and positions in juxtaposed relation to said central area, said side and end panels being mutually cooperable when in said positions normal to said central area to form a perimeter wall about and normal to said central area for receiving said filter element in its expanded condition, said filter frame blank being foldable into a compact generally flat rectangular condition having a longitudinal length and transverse width generally similar to the longitudinal length and transverse width of said filter element panels, and

a filter grill mountable on said filter frame, said filter grill being made from a generally rectangular corrugated cardboard blank defining a generally rectangular planar central area of a size and configuration substantially equal to the size and configuration of said filter frame central area and enabling air to pass therethrough, said filter grill blank further defining laterally opposite longitudinally extending marginal side wall panels and laterally opposite transverse marginal end wall panels foldable from positions coplanar with said central area to positions disposed normal to said central area for mutual cooperation to establish a boundary wall about the periphery of said filter grill central area, said filter grill central area and side wall and end wall panels being foldable into a compact generally flat rectangular condition having a longitudinal length and transverse width generally similar to the longitudinal length and transverse width of said collapsed filter element panels, said filter element, filter frame blank and filter grill blank being foldable into generally flat rectangular compact positions and stackable in juxtaposed relation for insertion into a carton.

22. A disposable air filter assembly as defined in claim 21 including a carton having a generally rectangular transverse cross section sized to enable insertion of said filter element, filter frame and filter grill when in their compact flat folded positions and stacked in juxtaposed relation.

23. A disposable air filter assembly as defined in claim 21 wherein said pleated filter element has opposite side surfaces, and including a metallic mesh support grid adhesively secured to a selected one of said side surfaces of said pleated filter.

24. A disposable air filter assembly as defined in claim 21 wherein said filter grill blank defines a plurality of pleat separating fingers formed integral with said filter grill and adapted to be interposed between adjacent pleats of the filter element when said filter grill is mounted on said filter frame and said filter element is disposed in an expanded condition within said filter frame.

25. A disposable air filter assembly as defined in claim 24 wherein said separating fingers are sufficient in number so that a separating finger extends into each space between adjacent pleats of said expanded pleated filter element.

26. A disposable air filter assembly as defined in claim 24 wherein said separating fingers are formed integral with said central area of said filter grill so as to define at least two transverse rows of said separating fingers.

27. A disposable air filter assembly as defined in claim 26 wherein said separating fingers in each of said transverse rows have free ends extending in a direction toward the free ends of the separating fingers in the other row of separating fingers.

28. A disposable air filter as defined in claim 21 including a generally rigid end plate secured in juxtaposed relation to an outer exposed surface of each pleated filter end panel.

29. A method of making a disposable air filter comprising the steps of:

providing an expandable pleated filter element having a plurality of generally equal size rectangular filter panels with adjacent panels being interconnected at mutually opposed longitudinal edges and having generally rigid end plates affixed to outer exposed surfaces of end panels;

providing a filter frame having a generally planar central area and laterally opposed pairs of sidewalls disposed in normal relation to said central area and having mutually interconnected ends so as to establish a continuous wall peripherally of said central area, said central area having one or more openings enabling air to pass therethrough;

inserting said filter element into said filter frame when expanded so that opposite marginal end edges on said filter panels engage said continuous wall to prevent air passage past the ends of said filter panels;

providing a filter grill having a planar central area and a peripheral wall disposed normal to said central area, said filter grill being sized to enable said peripheral wall of said filter grill to be disposed in juxtaposed relation to the peripheral wall of the base surface with the filter element interposed between the central areas of said filter frame and

filter grill, said filter grill having a plurality of separating fingers formed integral therewith for insertion between adjacent pleats of the expanded filter element;

attaching the filter grill to the filter frame; and

inserting said separating fingers between pleats of said expanded filter element.